# **Green Chemistry**

Cutting-edge research for a greener sustainable future

# rsc.li/greenchem

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

# IN THIS ISSUE

ISSN 1463-9262 CODEN GRCHFJ 27(40) 12489-12846 (2025)



#### Cover

See Jacek Ryl, Rodrigo A. A. Muñoz et al., pp. 12586-12601.

Image reproduced by permission of Marcel Takashi Ueta from Green Chem., 2025, 27. 12586.

Image created by Marcel Takashi Ueta using the background mesh image by GarryKillian and tire image by ranilson-arruda, both from Freepik. Molecule taken from PubChem.

#### **CRITICAL REVIEW**

#### 12499

## Incorporation of lignin into adhesives: a review

Juan Paez and Pedram Fatehi\*

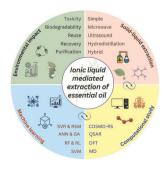


### **PERSPECTIVE**

#### 12538

Ionic liquid-mediated solid-liquid extraction and separation processes for essential oils: modern trends

Pankaj Kumar, Sonali Khanal, Isha Soni, Pooja Shandilya, Manish Kumar, Dinesh Kumar, Tejwant Singh Kang and Vinay Chauhan\*







At the heart of open access for the global chemistry community

**Editor-in-chief** 

Russell J Cox

Leibniz Universität Hannover, Germany

# We stand for:



**Breadth** We publish work in all areas of chemistry and reach a global readership



**Quality** Research to advance the chemical sciences undergoes rigorous peer review for a trusted, society-run journal



Affordability Low APCs, discounts and waivers make publishing open access achievable and sustainable



Community Led by active researchers, we publish quality work from scientists at every career stage, and all countries

# Submit your work now

rsc.li/rsc-advances

@RSC\_Adv

# **COMMUNICATIONS**

#### 12574

# Short and sustainable synthesis of the anticancer agent tepotinib

Eduam O. Boeira, Angélica V. Moro\* and Bruce H. Lipshutz\*

#### 12580

# Skeletal editing of anthranils for chemodivergent synthesis

Haixia Li, Jianming Liu, Yanping Huo, Xianwei Li, Qian Chen and Yang Gao\*

#### **PAPERS**

#### 12586

# Additively manufactured electrochemical platforms from reclaimed ground tire rubber for environmental monitoring

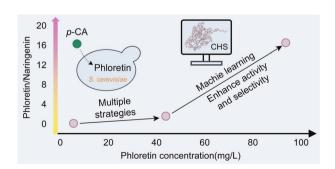
Gilvana P. Siqueira, Agata Rodak, Raquel G. Rocha, Tomasz Swebocki, Mateusz Cieślik, Eduardo M. Richter, Krzysztof Formela, Jacek Ryl\* and Rodrigo A. A. Muñoz\*



#### 12602

# Machine learning-guided engineering of chalcone synthase enables high-selectivity phloretin biosynthesis in yeast

Mei Li, Canyu Zhang, Hui Liang, Boyang Wu, Wenxi Yu, Guangjian Li,\* Yufei Cao\* and Wen-Yong Lou\*



#### 12613



# Biomimicry of CO<sub>2</sub> transfer through a biotin-mediated ATP-free pathway

Abdussalam K. Qaroush,\* Feda'a M. Al-Qaisi,\* Ala'a F. Eftaiha,\* Rana T. Abu-Saileek, Khaleel I. Assaf, Alex MacDonald and Philip G. Jessop

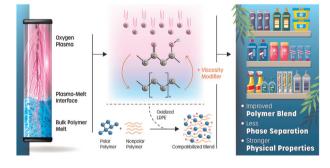
#### 12621



# SolECOs: a data-driven platform for sustainable and comprehensive solvent selection in pharmaceutical manufacturing

Yiming Ma, Shang Gao, Neel Mehta, Qinqing Fu, Wei Li and Brahim Benyahia\*

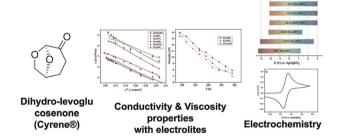
### 12642



# Sustainable upcycling of polyethylene waste to compatibilizers and valuable chemicals

Darien K. Nguyen, Zoé O. G. Schyns, LaShanda T. J. Korley\* and Dionisios G. Vlachos\*

#### 12659



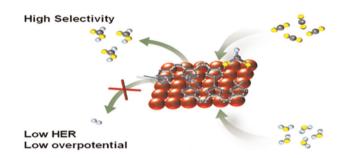
# Electrochemically relevant physical-chemical properties of tetraalkylammonium salts solutions in the renewable solvent dihydrolevoglucosenone (Cyrene®); electrochemical behaviour of some representative organic molecules

José M. Ramos-Villaseñor, Jessica Sotelo-Gil, Maricarmen P. Flores-Morales, Ruben Vasquez-Medrano and Bernardo A. Frontana-Uribe\*

#### 12672

Acidic CO<sub>2</sub> electroreduction to formic acid at low overpotentials over Cu modified with a dual site polymer

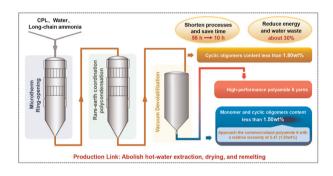
Yajuan Wang, Zijun Zhang, Chunjun Chen,\* Yingxuan Liu, Yichi Zhang, Mingjie Cheng, Xia Bai, Shuaiqiang Jia, Mingyuan He, Haihong Wu\* and Buxing Han\*



#### 12679

Inhibition of cyclic oligomer formation *via* rare earth coordination and long-chain amine end capping during PA6 synthesis process

Junting Gao, Feng Gao, Ke Liu,\* Wenxing Chen and Wangyang Lu\*



#### 12694

Evaluating lithium recovery using electrochemical membrane separation: cost analysis and design strategies

Sobhan Neyrizi, Keimpe Nevenzeel, Dirk J. Groenendijk, Ben in 't Veen, Jack Ledingham and Paul J. Corbett\*

# Optimizing an electrochemical Li recovery process

Cell pair thickness

Width/Length

Spacer dimension







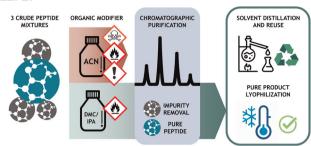
#### 12715

Synthetic autotrophic yeast enables high itaconic acid production from CO<sub>2</sub> via integrated pathway and process design

Özge Ata,\* Lisa Lutz, Michael Baumschabl and Diethard Mattanovich



#### 12727



# Replace, reduce, and reuse organic solvents in peptide downstream processing: the benefits of dimethyl carbonate over acetonitrile

Chiara De Luca, Chiara Nosengo, Matteo Spedicato, Laura Magagnato, Giacomo Fogli, Marco Carraro, Walter Cabri, Marco Macis, Alberto Cavazzini, Simona Felletti.\* Antonio Ricci\* and Martina Catani

#### 12738 Air 📗 HNO<sub>2</sub> $N_2(A)$ H<sub>2</sub>O OH HNO<sub>3</sub> NO<sub>2</sub> $N_2(X)$ NO N/N<sub>2</sub> Ν N2 N<sub>2</sub>O

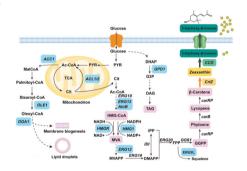
Needle-water dominant

Bubble discharge dominant

# A green route to nitrate-selective nitrogen fixation: catalyst-free hybrid discharge integrating plasma-liquid energy coupling

Zi-Kai Zhou, Zhi Zheng, Shu-Qi Li, Yu-Zheng Wang, Jian-Ping Liang, Zhao-Lun Cui, Xiao-Qiong Wen\* and De-Zheng Yang\*

#### 12751



# De novo biosynthesis of zeaxanthin and 3-hydroxyβ-ionone by engineered Yarrowia lipolytica

Xin-Liang Chen, Lei Wang, Ying-Ying Wu, Laijiayun Jin, Xin Feng, Yu-Yue Ma, Hao Liu, Qiang Hua, Ze-Jian Wang\* and Liu-Jing Wei\*

#### 12765



# Natural product driven redox-recovery of lithium cobalt oxide cathodes under mild conditions

Chang-Lian Xu, Xinlei Ji, Honghao Zhang, Xiaoxun Xu,\* Lilin Wang, Guiyin Wang, Guochun Lv, Xin Qi, Junzhuo Cai, Shirong Zhang, Zhanbiao Yang, Zhang Cheng, Lin Kong and Yaoyuan Zhang

#### 12778

# Chiral chlorophyll-inspired clusters steering electron transfer for enhanced CO<sub>2</sub> photoreduction

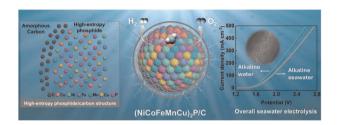
Yin-Hua Zhu, Jian-Bo Yang, Jiu Lin Zhou, Yong-Qi Ji, Hua Mei\* and Yan Xu\*



#### 12785

An activity-selectivity-stability-balanced bifunctional high-entropy phosphide for overall seawater splitting at industrial-level current density

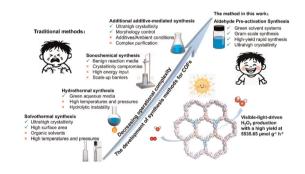
Changrui Feng,\* Yifan Zhou, Shuying Li, Yuxia Jin, Meng Chen, Rui Yang, Wenjia Zhou, Zhengkun Xie,\* Xiumin Li, Xiangyu Chen, Wenhao Lian, Abuliti Abudula and Guoqing Guan\*



#### 12798

# Eco-friendly synthesis of imine-based COFs for efficient photocatalytic H<sub>2</sub>O<sub>2</sub> production

Yayang Wang, Ting Xu, Zhongxing Zhang, Yaowen Wang, Jiming Huang,\* Mi Tang and Zhengbang Wang\*



#### 12809

# 2-Methyl-2-(pyridin-2-yl)malononitrile: a siteselective cyano transfer reagent for photocatalytic cyanation reactions

Xiang-Chuang Tan, Lei Yan, Hao-Ni Qin and Peng-Fei Xu\*

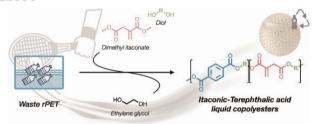


# 12819 Cellulosic HBD CAB/Thy eutectic system

A solvent-free route to fully recyclable, high-performance cellulosic plastics

Yuchen Cao and Ren'ai Li\*





One-pot depolymerization-repolymerization of PET waste into sustainable photocurable liquid copolyesters for high-performance additive manufacturing

Rosario Carmenini, Alberto Sanz de León, Tiziana Benelli, Loris Giorgini, Mauro Comes Franchini, Sergio I. Molina and Mirko Maturi\*